

(DON'T) HIT THE BRICKS: CARING FOR HISTORIC MASONRY

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Something about bricks and stone fascinates me. Masonry offers seemingly limitless variations of textures, patterns, and colors, and these variations are crucial character-defining elements of a historic masonry structure. In order to preserve that character, though, you have to preserve your masonry. That's not as easy as it might seem. For all its perceived durability, historic masonry is vulnerable to the elements like any other building material. It's also not impervious to the bad judgment of humankind, so learn to treat it right. Good intentions have been the ruin of many a historic brick! Obviously, you can't learn everything there is to know about historic masonry in 2000 words or less, so consider this article the *Cliff Notes* version of what you as a commission member should know about the identification, care, and repair of historic masonry.

Identification

Bricks are easy to identify. Even though they can vary greatly in size and appearance, most of us can pick a brick structure out of a lineup. Whether hand-molded or extruded, bricks all look pretty much the same. Then there's stone, which is easy enough to identify as stone, but can you tell the difference between sandstone and limestone? How about granite or marble? Or cast stone, which isn't stone at all but concrete? It's important to learn what material you're dealing with before you make any decisions about how to treat it. For example, you don't want to use an acidic cleaner on marble or limestone, or you may etch it. Consulting with a professional geologist provides the most definitive answer; he or she may even be able to tell you what quarry or clay bank originally provided your materials.

Looking for trouble

Moisture is historic masonry's biggest enemy (people are a close second). Water infiltration, combined with repeated freeze/thaw cycles, causes severe deterioration of masonry and mortar. The areas most likely to deteriorate are those most exposed: look first to sills, foundations, chim-

neys, lower walls, and stairways. A heavy rain offers the best circumstances for you to evaluate potential problem areas on a historic structure. In order to find out what kind of damage water might be doing, you first have to know where it's coming from and where it's going. Take an umbrella and walk around the next time it rains—you may be surprised by what you see. Is an abnormally large proportion of water running down a particular corner of the structure? Check to see if you have mortar loss or deteriorated bricks in that area. Is water hitting the ground and splashing back onto the foundation? Check for deterioration there, as well. Is the water pooling at the foundation and not draining properly? If so, you may find yourself dealing with rising damp, which is what happens when porous masonry wicks water upward, where it can stay inside your walls and freeze.



There are several signs of trouble here. Note the algae and staining, indicating that moisture splashing onto the wall is not evaporating. The dark bricks are those on which the painted fronts have spalled off, leaving the inner, softer core of brick exposed. Rising damp is causing the paint to flake off in multiple places—see the clear line of demarcation between damp and dry exhibited by flaking vs. well-adhered paint. Photo courtesy of: Mantero Consulting Group

What constitutes trouble?

Now that you know where your potential problem areas are, look for the following:

- *Mortar deterioration*—it may be moist, crumbly, or missing. Moisture combined with freeze/thaw cycles can break mortar apart. So can excessive settlement or movement within a structure.
- *Effluorescence*—sometimes salts leach out due to excess moisture within a masonry structure. They recrystallize on the surface of masonry and form a white crumbly or powdery substance. Their presence means moisture has gotten inside your structure's walls.
- *Staining or algae/moss*—rust stains may mean that moisture is getting into a wall and damaging iron clamps, anchors, or other metal components. Algae stains or moss can signify drainage or runoff problems. Water isn't moving away from the structure quickly enough, and it remains consistently moist.
- *Spalling*—part of the masonry unit falls off. A large concentration of spalled masonry in one area means there is moisture present. That moisture is going through freeze/thaw cycles and causing the fronts of the bricks or stones to pop off. A single occurrence of spalling can point toward moisture problems, or it can simply indicate a defective masonry unit such as an underfired brick. Widespread spalling, however, means wet walls that are freezing and breaking apart your masonry units from the inside out.
- *Cracking*—can be a sign of several things. 1) You've got current movement or settlement and should think about stabilizing the structure's foundation before moving forward with other repairs. 2) You have cracks from long-ago settlement that has since stopped. In this case, simply repair the mortar to avoid water infiltration. 3) Water has managed to infiltrate your structure and freeze, damaging your mortar, or worse, your masonry units. Other cracks set off more major red flags: cracks through masonry units, rather than through the mortar. This means that the mortar is too hard for the brick, and when the structure moves, the brick, rather than the mortar, is cracking under the stress.



A classic case of rising damp (visible here as darker brick). Moisture is infiltrating the ground at the juncture between the veranda floor and the masonry walls of the structure. This moisture is then wicked up by the porous masonry walls. Since this brick is bedded in lime mortar, there is a place for the moisture to escape; however, unless the drainage problems are fixed, the rising damp will continue to be a problem because the bricks will continue to wick water from the ground.

Photo courtesy of: Mantero Consulting Group

How do I repair those trouble areas?

There's not much use in making a repair if you don't first try to figure out why you need the repair. If you don't fix the root cause, you are liable to make the same repairs over, and over, and over, and over—I'm sure you see where I'm going with this: Not that you can avoid having to do occasional retouch work on previous repairs, but would you rather see your repair last for ten months or ten years?

First of all, if you have a historic masonry building that is experiencing mortar loss but has no deterioration in the masonry itself, congratulations are in order. Your mortar is doing exactly what it's supposed to be doing. In masonry structures the mortar must be a "sacrificial" material. That is, the mortar must be softer than the masonry units it beds. To really understand masonry, you must understand mortar. Most people think of mortar as the glue that holds masonry together—but it's actually the opposite. Mortar provides a bed that keeps masonry units from rubbing together and damaging one another. And one of the single best things you can do for historic masonry is to use an

appropriate mortar. In most cases, when dealing with historic masonry, the mortar should be lime-based, with little or no Portland Cement added. Lime mortars allow for water vapor to pass through mortar, which in turn allows water that has gotten in to get back out. In addition, lime mortars are soft and flexible enough to give with masonry units as they expand and contract slightly. Plus, lime mortars are self-healing to some extent; that is, free lime particles within existing mortar migrate into small cracks, where they react with water and carbon dioxide and fill the void.

When it comes to repairing mortar joints, consider these crucial points:

- *Match the mortar used in the original construction*—use the same sand if you can find it. At the least, use sand that is the same color as the original. It is best to commission a mortar analysis before starting work; this test allows you to determine the exact amounts and kinds of lime and sand.
- *Protect your work from the elements*—you must keep it from drying too quickly but also allow for air circulation. Lime mortars take time to set and become fully carbonated, so be patient. It's best not to undertake exterior masonry repairs in cold weather, as frost can ruin all your hard work by cracking the mortar before it has had time to set.
- *Rake out your joints*—rake joints to approximately one inch, or to a depth twice the thickness of the joints in order to remove loose mortar and dirt. If you're tempted to break out the power saw to rake out your joints, don't do it! Use only hand tools to avoid damaging your historic bricks or stone. It's important to note that you can rake out a good bit of mortar and still consider your masonry unit to be well-bedded in what's left. When in doubt, or when your masonry is no longer bedded at all in its mortar, consult with a professional.
- *Wet down your masonry and mortar before repointing*—everything should be thoroughly moist before you start, or you run the risk that your old masonry and mortar will suck the moisture from your new mortar, leaving you with just sand. **Note—"tuckpointing" is not the same as repointing. The two terms are often used interchangeably but this is incorrect. Repointing is replacing lost mortar, matching the joint profile that was there before. Tuckpointing is a specific joint profile. It is painstaking work in which the bedding mortar is colored to match its masonry. A thin groove is then raked out and replaced with a mortar of contrasting color (the new mortar is "tucked" into the groove). This leaves the visual effect of a very fine joint.*
- *Match the existing joints when repointing*—it's important to match the depth as well as the profile of the original joints, but keep this in mind. You should finish your joint slightly behind the surface of the brick. Historic masonry often erodes around the edges, and repointing so that the mortar is flush with the front of a masonry unit can create the effect of a wall full of mortar with just a little masonry thrown in, rather than the other way around.

If you have trouble with historic masonry beyond mortar loss, use care and think through your problem before you embark on making repairs. *The Secretary of the Interior's Standards for Rehabilitation* offer sound guidance, as do the *Technical Briefs* issued by the National Park Service, but there are some common human errors you should know about so you can avoid them.

Sealing masonry with a waterproof or water-repellant coating is generally not a good idea. You want to keep moisture out, so sealing may look like the answer, but consid-

er this: by sealing, you may be trapping moisture in. That moisture will choose the path of least resistance when it wants to leave your walls. That could leave you with a water-damaged interior. Or, the moisture will stick around and begin to freeze/thaw, causing spalling and other exterior material failures. Also take into account the fact that sealants are rarely reversible.

Any type of "blasting" is one of the worst things you can do to historic masonry. Sandblasting is never appropriate. You should also avoid using glass beads, walnut shells, talcum powder, or other, "soft" materials. Even high-pressure water sprays typically do more harm than good. When any material hits historic masonry at high velocity, it doesn't matter how soft it is—you'll likely do irreparable damage.

If you have a painted brick building, don't be too quick to remove the paint. It could be there purposefully and may be historic—masons sometimes painted soft or underfired brick to protect it. If it is not historic and you want to remove it, start by trying the gentlest means possible: water and a natural bristle brush (not a wire brush—the effect is virtually the same as with sandblasting). Never resort to blasting the paint off. If it's adhering to the masonry well enough that blasting is the only resort, leaving the paint alone is probably the best answer. If the paint simply must go, you can try chemical strippers, which can still be quite gentle if you choose the appropriate stripper for your substance. Consult with a professional for help in choosing the correct paint-stripping product and try several small tests in inconspicuous areas. Be sure to take the proper safety precautions in the event that your masonry is coated with lead-based paint.



The front "skin" of the brick has spalled off, leaving the inner softer brick exposed. Salts contained within the brick are leaching out, leaving powdery/crumbly salts at the surface of the brick; this is known as efflorescence.

Photo courtesy of: Mantero Consulting Group

How can I find a decent contractor?

Look for someone with references from owners of historic structures, and talk to those owners to learn what kind of work the contractor did specifically, the quality of the work, and how long the it has lasted. Find out what kinds of materials the contractor uses. Ideally, your contractor should be familiar with traditional materials and methods. If they mention "blasting" or automatically specify Portland mortar for mortar repointing work, without doing a mortar analysis, they're probably not the contractor for you.

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